Case study

Advancing offshore digitalization

Tampnet transforms maritime industries while promoting sustainable innovation with private offshore 4G LTE and industrial Internet of Things

ERICSSON

tampnet

Tampnet revolutionizes offshore data and voice communications

Case study:
Tampnet

Industry:
Maritime telecom service provider

Executive summary

Tampnet operates the world's largest offshore high-capacity communication network in the North Sea and the Gulf of Mexico. Offshore oil and gas companies need high-speed broadband to connect workers, automate processes, and reduce safety risks through enabling remote collaboration and inspections while reducing operational costs. By partnering with Ericsson and a broad ecosystem of technology providers, Tampnet built a maritime 4G LTE network and deployed cloud-based IoT connectivity management, enabling industrial Internet of Things (IIoT) use cases for autonomous operations and predictive maintenance on oil and gas platforms.

As a result, Tampnet is helping its customers improve worker safety by automating 75% of previously manual tasks, resulting in savings of millions of dollars through incorporating predictive maintenance technologies for asset integrity, such as corrosion and vibration monitoring. Environmental monitoring programs also benefit from the 4G technology, providing safe deployment of sensors to monitor greenhouse gas emissions and other environmental hazards. Tampnet is now positioned to further extend its maritime network reach to help additional maritime industries, like offshore wind farms and mobile structures such as vessels and rigs, while also improving safety, efficiency, and agility at sea.

At-a-glance

Goal:
Provide offshore industries with reliable, high-speed network connectivity to support advanced, automated operations that improve safety, efficiency, and agility.

Approach:
- Build private 4G LTE cellular network connecting data, people, and assets at sea
- Deploy industrial Internet of Things (IoT) network to automate previously manual tasks
- Offer cloud-based IoT connectivity management for total visibility and control of connected assets
- Leverage partner ecosystem to enable remote, autonomous, and robotic maritime operations

Results:
- Delivered high-speed, low-latency connectivity across ~500,000 sq. km in the Gulf of Mexico and North Sea
- Improved worker safety with 75% reduction in hazardous, manual inspections
- Enabled millions of dollars in savings from automated processes, condition monitoring of corrosion and vibration, and connected worker technologies
- Achieved up to 40% lower cost, on average, for operating offshore assets
- Supported 1,000–1,500% annual increase in offshore data traffic, enabling advanced IoT use cases

Redefining what's possible for offshore industries

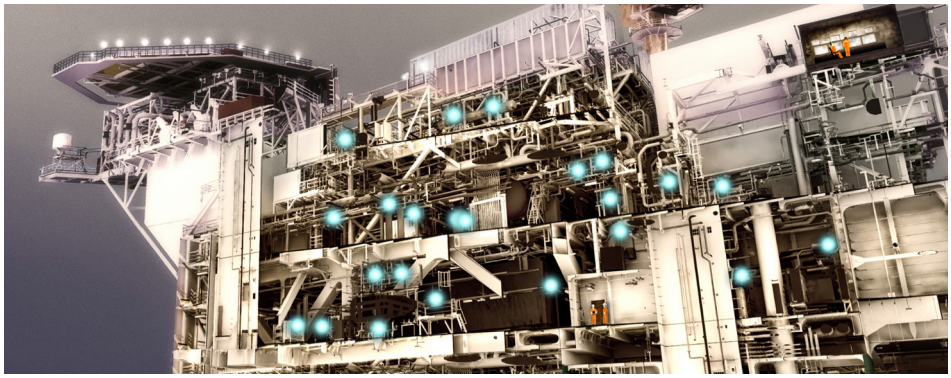
Looking out from the mainland, the vastness of the Gulf of Mexico can bring a sense of awe, wonder, or even a little trepidation. But to Frode Støldal, the open water is as comfortable as home. "I grew up in a maritime environment," he says. "I am the first generation on my father's side to not work on a ship, but the sea has always been a very important part of my life."

Originally from Norway, Frode is now president of Tampnet Americas based in Houston, the US arm of global maritime telecom service provider, Tampnet. And when he looks out across the Gulf, Frode sees huge opportunities to transform maritime industries—everything from offshore oil and gas rigs and floating wind farms, to intercoastal shipping and deep-water fisheries.

His vision is based on what cannot be seen across the waves: hundreds of kilometers of fiber communication cable deep below the water's surface, and above it, a high-capacity 4G LTE wireless network that provides connectivity spanning nearly every corner of the Gulf.

Bringing modern wireless connectivity to the open seas

Historically, offshore oil and gas platforms were lonely places for people. Communication back to the mainland was limited, typically, to 2G cellular, microwave, and satellite. The service was slow, intermittent, and expensive. Today, however, all that is changing thanks to the 4G LTE and, soon,



5G wireless network deployed by Tampnet and based on Ericsson technologies. If you ask Frode, wireless technology has potential to be nothing less than life-changing.

"When I lived in Bangladesh, I saw firsthand the impact mobile communication can have on a society," Frode recalls. "New opportunities emerged practically overnight. People were lifted up. We can do the same thing for maritime industries. Imagine, with high-capacity wireless connectivity, so many activities that once required manual, human intervention can be digitized, virtualized, and automated."

The immediate impact of new voice and data applications on an offshore oil and gas rig, for example, would be safer working conditions, more efficient business operations, improved environmental measurements—and that is just the beginning. High-capacity wireless connectivity opens the door for the industrial Internet of Things (IoT) and the advent of remote operations, autonomous processes, and predictive intelligence that elevate quality of life for workers while reducing risks and operational costs for the business.

Overcoming the challenges of a harsh maritime environment

Frode is quick to point out that none of the advanced solutions and automation envisioned for the maritime industry would be possible without high-capacity, low-latency connectivity. The vision would also not be complete without a broad ecosystem of partners providing enabling technologies, applications, and data intelligence. As a key partner in that ecosystem, Ericsson has worked hand-in-hand with Tampnet to build its advanced 4G LTE wireless network, overcoming challenges and celebrating successes.

Deploying wireless base stations in a harsh environment like the Gulf of Mexico is no easy feat. Projects require in-depth planning and preparation, with systems selected to suit the structure geometry, optimal installation heights, and signal transmission range of 60-70 km. Ideally, systems are installed at the highest point of a facility or on its radio tower, so installation personnel are qualified in scaffolding and rope access techniques in order to safely carry out the process. Environmental challenges such as high winds, storms, or extreme heat also need to be navigated and managed appropriately.

These are challenges that Ericsson technology is designed to handle. Frode explains, "It is essential for Tampnet to have a technology partner able to work with us under such extreme conditions. I've known Ericsson throughout my career to be a successful innovator, willing to collaborate and find solutions to the tough challenges."

He adds, "We chose Ericsson because their solutions are robust, and designed to operate in harsh conditions, such as out in the Gulf. They will scale as our customers' demands grow. And they bring world-class competency in security, which is extremely important for the mission-critical use cases being built on our network."

Recognizing the need for enhanced security requirements for their customers, particularly when digitizing processes, Tampnet relies on Ericsson's commitment to end-to-end security on both network and device levels.

Transformative, connected worker solutions with private 4G LTE networks

Today, Tampnet has a subsea fiber-optic network in the Gulf of Mexico spanning 1,500 km and providing backhaul for the 4G network, covering 250,000 sq. km. Where 2G infrastructure existed, Tampnet has carried out upgrade projects, deploying a redundant Ericsson Core 4G LTE/GSM RAN network along with an Ericsson microwave solution, designed to withstand humidity and the harsh offshore conditions.

The 4G LTE wireless network now provides more than 50 rigs in the Gulf with access to high-capacity, low-latency data and voice services. These include public services for personal use by staff onboard the platform. Frode notes, "You can be in the middle of the sea and use your mobile phone just as you would on land. It connects automatically."

40%
Lower operating costs

"We chose Ericsson because their solutions are robust, and designed to operate in harsh conditions, such as out in the Gulf. They will scale as our customer demands grow. And they bring world-class competency in security, which is extremely important for the mission-critical use cases being built on our network."

— Frode Støldal, President, Tampnet Americas

Importantly, Tampnet is also building private 4G LTE and 5G networks for the offshore oil and gas industry, supporting a broad range of transformative connected worker solutions for tablets, smartphones, wearables, sensors, and machine-to-machine (M2M) communication. For example, an innovative augmented reality solution visually connects workers performing inspections, fault-finding, or other critical tasks on the platform in real time with remote experts who can guide operators through the task or verify work once it is completed, improving efficiency and helping ensure the work is performed correctly the first time, while also improving safety for everyone on the rig.

Improving safety by automating dangerous jobs through IoT

Tampnet's network provides a foundation for additional technologies that are key to many of the advanced use cases Frode envisions on offshore oil and gas rigs. In fact, Tampnet recently deployed Ericsson IoT Accelerator, providing cloud-based IoT management for thousands of sensors and remote monitoring instruments.

Frode notes, "Through our partnership with Ericsson, we are bringing the same IoT connectivity benefits to the offshore industry and enterprises that land-based companies are benefitting from. In many instances, Tampnet is pioneering new services and business models offshore that are

later adopted onshore. Together, we are truly digitalizing some of the most remote offshore industries as part of the fourth industrial revolution. These are exciting times for our customers."

Indeed, Tampnet customers are already benefiting from innovative IoT solutions, such as corrosion monitoring, a major need for massive steel structures in the middle of the sea. Sensors placed on beams and pipes throughout a platform continually transmit data on the condition of the structure across the network to a central database where analytics are performed to determine the extent of corrosion and if repair work is necessary. It provides real-time insights, and allows operators to focus manual inspections on problem areas, reducing extended exposure of personnel to dangerous conditions, such as working at heights, in confined spaces, or over-the-side.

"Corrosion is close to a $6 trillion problem in the offshore oil and gas industry," Frode explains. "By leveraging wireless 4G IoT sensors, companies can identify and repair corroded structures before the situation causes major damage. It can save companies millions of dollars in operating, repair, and lifecycle costs.

Similarly, wireless sensors placed on platform legs can measure vibration as the platform is raised and lowered—an extremely hazardous process. Measuring vibration levels will detect quality of performance, with any levels of vibration above a set parameter indicating a problem. Analytics and artificial intelligence performed on the data can then predict maintenance requirements, again reducing costs and, most importantly, improving safety.

Environmental impact is another major initiative for offshore oil and gas companies. IoT enables them to equip drones with sensors to measure greenhouse gas (GHG) levels in the atmosphere surrounding rigs and analyze the data to track output and guide reduction measures. Drones can also be used for visual inspection of structural integrity anywhere on the platform, particularly areas difficult to reach by people.

Danish Khawaja, Tampnet's director and head of global service delivery, points out, "In the oil and gas industry, structural integrity of vessels and platforms, as well as plant integrity are vital to safety and efficient operations. These facilities are required to meet stringent testing regimes to maintain industry safety standards and class certification. Traditionally, these inspections have been laborious and costly endeavors, requiring extensive scaffolding and teams of certified rope-access and confined-space personnel to carry out surveys and inspections manually. Often qualified inspectors are in high demand, further adding complexity to the planning of these projects.

"With the 4G connectivity now available, the latest condition monitoring and inspection equipment like vibration and temperature sensors, drones/UAS and robots, can be mobilized to supplement various non-destructive testing tasks, such as visual inspection, ultrasonic thickness testing, and corrosion mapping of piping, pressure vessels and structural assets. Incorporating these technologies into the predictive maintenance and inspection planning processes, enables asset integrity engineers to better identify, prioritize and target areas of concern for further manual testing and repair, while reducing costs and mitigating risk factors."

Frode adds, "When we work with our customers on large digital programs like connected worker and IoT, we typically enable cost reductions of 30 to 40 percent. When you consider the cost of operating an offshore asset is upwards of $200,000 per day, that savings is quite significant."

Unleashing a future of limitless offshore business opportunities

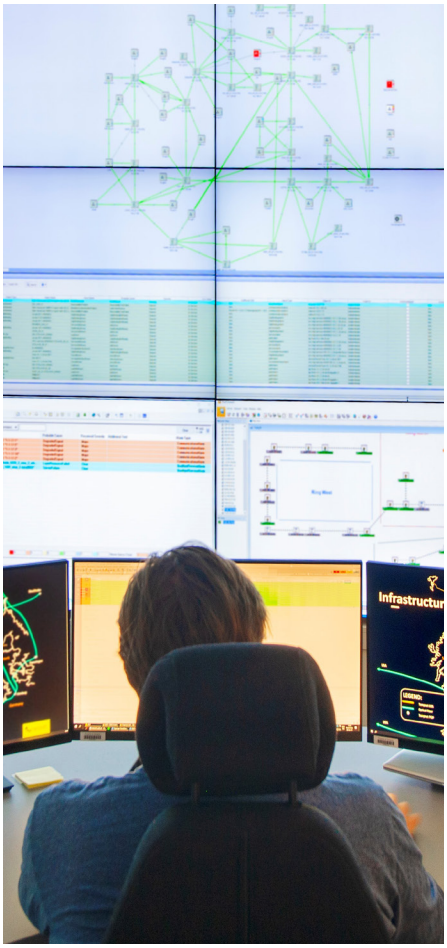
Growing use cases for IoT solutions, robotics, and operational automation create huge volumes of data on top of an already data-intensive industry. The number of devices onboard offshore platforms is more than doubling year over year. And as Frode reports, "Data traffic in the last year increased somewhere between 1,000 and 1,500 percent. Digital transformation is changing communication patterns and best practice operations."

With the surge in data and increasing demand for real-time operational automation, many companies are adopting edge computing to bring data processing closer to where the operations are running.

It is conceivable that offshore oil and gas platforms will likely become large offshore data centers. More automation and real-time data communication means fewer people will be needed on the platform, allowing them to operate systems remotely in safer environments on the mainland, and in many cases allow upskilling of staff where manual tasks are no longer needed.

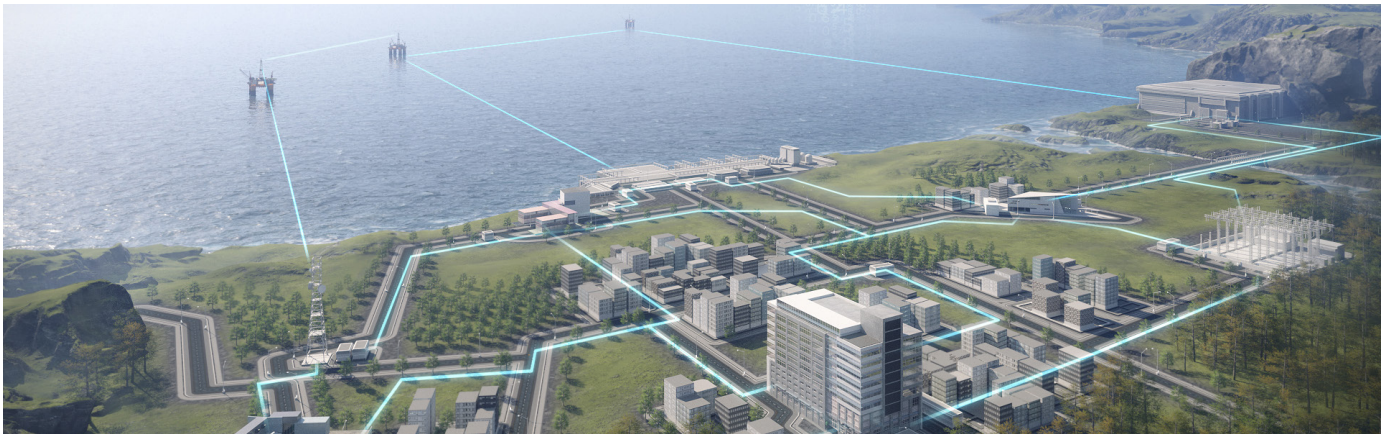
"Marine assets like tension leg platform rigs and floating production vessels require class certification at set intervals, necessitating close visual inspection and ultrasonic thickness testing of the structural materials. This technology will enable our customers to detect potential safety issues sooner and help make repairs more efficient and less costly."

— Danish Khawaja, Director & Head of Global Service Delivery, Tampnet



"When we work with our customers on large digital programs like connected worker and IoT, we typically enable cost reductions of 30 to 40 percent. When you consider the cost of operating an offshore asset is upwards of $200,000 per day, that savings is quite significant."

— Frode Støldal, President, Tampnet Americas



With all the advanced capabilities already being implemented on the current 4G maritime network, Frode suggests much more is to come. "I believe 5G is going to revolutionize the way we do business. The combination of 5G linking IT infrastructure, cloud, edge, AI, and machine learning will bring massive transformation. Imagine a high-speed, low-latency network covering the entire sea, allowing autonomous vessels and robots to do the work of thousands of people. We'd see all new industries moving offshore."

It's a bold vision but entirely achievable given where technology is already heading in industries around the world. Embracing technology from Ericsson and other ecosystem players, Tampnet is in a strong position to lead oil and gas, as well as other industries worldwide, to develop more offshore capabilities.

"Partnering with Ericsson is quite interesting to us because they bring experience from many other industries beyond oil and gas," Frode says. "The digitalization Tampnet enables can easily be extended across all types of verticals—fisheries, deep-sea mining, shipping, renewable energy, carbon capture—the possibilities are endless."

Danish adds, "For over a decade, IoT and planning for digitalization has been of great interest for offshore oil and gas operators. However, connectivity solutions were either impractical, unavailable, or required costly cable runs, and added to this, appropriately certified wireless sensor options were limited. Technology has come a long way since then, and with Tampnet's extensive 4G network and partners like Ericsson, we can provide the advanced technology and level of scalability our customers need to finally execute their digitalization and IoT plans—not just today but for a sustainable future for the industry.

"I believe 5G is going to revolutionize the way we do business. The combination of 5G linking IT infrastructure, cloud, edge, AI and machine learning will bring massive transformation."

— Frode Støldal, President, Tampnet Americas

Solution Highlights

Delivering the largest offshore high-capacity communication network in the world

From subsea fiber through to 4G LTE and microwave systems, Tampnet is connecting data, people, and operational facilities across remote offshore fields, improving worker safety while boosting operational efficiency and lowering costs for maritime industries.

Transformational solution

- Maritime 4G LTE network, enabling industrial Internet of Things (IoT) use cases for autonomous operations and predictive maintenance on oil and gas platforms across the Gulf of Mexico and North Sea

Ericsson hardware

- GSM and 4G/LTE Radio Access Network (RAN)
- MINI-LINK Microwave mobile backhaul
- Ericsson Virtual Evolved Packet Core
- Ericsson Cloud Execution Environment

Ericsson software

- Mission Critical Communications
- Voice over LTE (VoLTE)

Ericsson services

- Ericsson IoT Accelerator

Solution advantages

- High bandwidth, low latency connectivity with reliable and predictable performance
- Leading RF technology transmits and receives farther on each base station
- Proven technology, tested and deployed in 43% of world's LTE market
- Complete cellular solution that includes RAN, EPC Core, OSS, Transport (microwave), and unique IoT connectivity management platform (IoT Accelerator)
- Radio equipment suited for frequency bands available in the Gulf of Mexico and North Sea
- Support for important use cases—voice, mission-critical push-to-talk, autonomous machines, remote control, predictive maintenance, environmental sensing
- Favorable cost efficiency compared to Wi-Fi
- Rich device ecosystem provides choice for communications
- End-to-end security, using SIMs, on both network and device levels

About Tampnet

Founded in 2001, Tampnet owns and operates the largest offshore high capacity communication network in the world and serves more than 350 oil and gas platforms, FPSO's, exploration rigs and vessels in the Gulf of Mexico and the North Sea, totaling over 4,500km of subsea fiber optic cable which is complemented by numerous high-capacity, carrier grade radio links, and an extensive 4G LTE network with a coverage area of over 500,000 sq. km. Recently expanding the network, Tampnet is now providing connectivity to offshore wind farms and has added Trinidad and Tobago and Canada to its portfolio of serviced regions.

About Ericsson

Ericsson enables communications service providers to capture the full value of connectivity. The company's portfolio spans Networks, Digital Services, Managed Services, and Emerging Business, and is designed to help customers go digital, increase efficiency, and find new revenue streams. Ericsson's investments in innovation have delivered the benefits of telephony and mobile broadband to billions of people around the world. The Ericsson stock is listed on Nasdaq Stockholm and on Nasdaq New York. www.ericsson.com

www.ericsson.com

SE-126 25 Stockholm, Sweden
Telephone +46 10 719 00 00

Sept 2022, Rev. 3